

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

REC'D 08 MAR 2005

WIPO PCT

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference BHPB0PPC00132 | | FOR FURTHER ACTION | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416). |
| International Application No. PCT/AU2003/001298 | International Filing Date (day/month/year) 2 October 2003 | Priority Date (day/month/year) 9 October 2002 | |
| International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ E21C 41/26 | | | |
| Applicant THE BROKEN HILL PROPRIETARY COMPANY LTD et al. | | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

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|---|--|
| Date of submission of the demand 11 March 2004 | Date of completion of the report 9 February 2005 |
| Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929 | Authorized Officer BARRY STEPHENS Telephone No. (02) 6283 2106 |

I. Basis of the report

1. With regard to the elements of the international application:*
- ☒ the international application as originally filed.
- ☐ the description, pages , as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the drawings, pages , as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of
2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:
- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).
3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished
4. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.
5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

Claims 1-7 are directed towards a method of aggregating a plurality of blocks related to a design configuration for extracting material from a particular location including the steps of determining a selected volume of material to be extracted, dividing at least a selected portion of the selected volume into blocks, forming at least one cluster, and propagating a cone from at least one cluster. It is considered that this comprises a first "special technical feature".

(Claim 10 is directed towards apparatus adapted to perform the method of claim 1)

Claim 8 is directed towards a method of determining slope constraints related to a design configuration for extracting material from a particular location, including the steps of using precedent arcs of blocks emanating from a selected clump to establish, at least in part, clump precedents. It is considered that this comprises a second "special technical feature".

(Claim 11 is directed towards apparatus adapted to perform the method of claim 8)

(Claim 12 is directed to apparatus adapted to perform the method of either claims 1-7 or claim 8)

(Claim 13 is directed towards apparatus adapted to determining slope constraints, and may properly be appended to claim 8)

Claims 14-20 and claim 21 comprise a methods of determining a cluster of material including the steps of allocation at least a portion of the material between a plurality of blocks, determining a first attribute related to coordinates corresponding to each block, assigning the first attribute to each corresponding block, assigning a second and/or at least one further attribute related to the block, and aggregating at least two of the plurality of blocks in accordance with the first attribute and the second attribute. It is considered that this comprises a third "special technical feature".

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
- ☐ the parts relating to claims Nos.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

| | | |
|-------------------------------|----------------------------------|-----|
| Novelty (N) | Claims 1-26, 28-34, 39-44, 47-68 | YES |
| | Claims 27, 35-38, 45-46, 68 | NO |
| Inventive step (IS) | Claims NONE | YES |
| | Claims 1-68 | NO |
| Industrial applicability (IA) | Claims 1-68 | YES |
| | Claims NONE | NO |

2. Citations and explanations (Rule 70.7)

Although the claims are in general vague in their wording and of indeterminate scope, (see also Box VIII), making it difficult to give a meaningful opinion regarding their novelty and inventiveness, the general concept of the invention as discussed in the description may be identified as methods and apparatus for an optimisation of the order in which blocks should be removed from a location in an open pit mine. This optimisation involves the use of one or more computer programs and mathematical algorithms, which per se are excludable from a search under Rule 39.1 and hence from any opinion.

In discussing the prior art, the Applicant admits that attempts have been made to optimise the order of block extraction in open pit mining operations. In fact, this is normal procedure in the industry- see, for example, the respective papers by Brealey & Atkinson, Pana, and Lerch & Grossman cited in the International Search Report. Moreover, a person skilled in the art, in seeking to optimise the order in which blocks should be removed from a mining location could be expected to refer to more recent published papers on the subject such as those of Bezdek et al, Wharton & Whittle, Underwood & Tolwinski, and Caccetta & Hill that were also cited in the International search Report. It would be obvious to the PSA to combine the teachings of any of the two groups of citations, as indeed the Applicant appears to have done.

According it is considered that the invention as claimed either lacks novelty, or lacks an inventive step as follows:

NOVELTY (N) Claims 27, 37, 38

-Pana

-Lerch & Grossman

Each of these documents either explicitly discloses the features as claimed or they were matters of common general knowledge at the publication date of the citations: For example, considering claim 27, in Pana see

- Determining the contents of a selected portion of material, and
- Identifying region(s) of material within the selected portion according to at least one of a plurality of characteristics

see, in particular, pages ZZ-8 and ZZ-9 "Input Requirements" and Fig. 3

[Continued in a Supplemental Box]

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 8 is of uncertain scope as it is not clear what is meant by "precedent arcs of blocks".

Claim 12 is not clear as to the meaning of "a predetermined instruction set". Similarly for claims 26, 38, 49 and 63.

Claim 13, which claims apparatus adapted to determining slope constraints, may be properly appended only to claim 8.

There is no mention in claim 13 of aggregating a plurality of blocks, to which the method of claims 1-7 are directed.

Claim 26, directed to apparatus adapted to determine the removal of material from a predetermined location, is unclear in its appendancy to claims 14 to 20 which are directed to a method of determining a cluster of material.

Claim 27 is not clear due to the indefinite nature of the expression "characteristic(s)". Similarly for claim 37.

Claim 40 is vaguely worded and of uncertain scope, defining a method including only the steps of clumping a number of blocks together and analysing the selected volume of material based on the clumped blocks.

Claim 41 is not clear as to the meaning of "mixed integer optimisation engine".

Claim 48 is vaguely worded and of uncertain scope, defining apparatus that includes only first means for clumping a number of blocks together and second means for analysing the selected volume of material based on the clumped blocks.

Claim 50 is not clear as the nature of the parameters constituting "equation 3" referred to therein have not been identified. Similarly for claims 51 and 52 in relation to "equation 4" and "equation 9" respectively.

Claim 62 is not clear in its reference to "equation 2" the nature of which has not been defined.

Claim 67 is not clear as to the ambit of "mine design" particularly as some of the claims to which it is appended are neither directed nor refer to a mine design.

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box IV

(Claims 23-25 are directed towards apparatus adapted to perform the method of claim 14)

Claims 27-34 are directed towards a method of determining characteristics of a selected portion of material including the steps of determining the contents of the selected portion of material and identifying region(s) of material within the selected portion according to at least one of a plurality of characteristics. It is considered that this comprises a fourth "special technical feature".

(Claims 37 and 38 are directed towards apparatus adapted to perform the method of claim 27)

Claims 40-44 and claims 48-49 are directed respectively towards a method of and apparatus adapted to analysing a selected volume of material at least partially comprised of a plurality of blocks, including the steps of clumping a number of blocks together and analysing the selected volume of material based on the clumped blocks. It is considered that this comprises a fifth "special technical feature".

As the above groups of claims do not share any of the identified special technical features, a technical relationship as defined in Rule 13 between the independent claims does not exist. Accordingly, the international application does not relate to a single invention or a single inventive concept.

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box VNOVELTY (N): Claims 35-36, 45-46, 68

Claims 25 and 36 are in essence directed to a mine per se and are consequently not novel.

Claims 36, 46 and 68 are in essence directed to material per se extracted from a mine and are consequently not novel.

INVENTIVE STEP (IS): Claims 27, 35-38, 45-46, 68

As above.

INVENTIVE STEP (IS): Claims 1-26, 28-34, 39-44, 47-68

-papers by :

-Brealey & Atkinson,

-Pana

-Lerch & Grossman

-Bezdek et al.

-Wharton & Whittle

-Underwood & Tolwinski

-Caccetta & Hill

To the extent that a clear construction of the invention as defined in these claims is possible, each of their features is either explicitly disclosed in one or more of the citations,, any such combination being obvious to the skilled worker in the art, or they are matters of common general knowledge in the art . Consequently these claims lack an inventive step.